

What is claimed is:

1. An image reading apparatus comprising:

a plurality of image sensors having different spectral characteristics from one another;

a layered image generation section for generating a plurality of pieces of layered image data on the basis of an output from the plurality of image sensors;

a comparison section for comparing a threshold of each of the plurality of pieces of layered image data against a pixel value of each of the plurality of pieces of layered image data, the threshold being predetermined corresponding to each of the plurality of pieces of layered image data, and for judging existence of a document image on each pixel;

an estimated document area determination section for determining an estimated document area of each of the plurality of pieces of layered image data on the basis of a result of judging the existence by the comparison section;

a document area detection section for detecting a document area on the basis of the estimated document area of each of the plurality of pieces of layered image data; and

a document reading section for reading a document on the basis of the document area detected by the document area detection section.

2. The apparatus of claim 1, wherein the document area detection section detects an area included in any one of the

estimated document area of each of the plurality of pieces of layered image data as the document area.

3. The apparatus of claim 1, wherein the plurality of image sensors include a color image sensor comprising three sensors having spectral sensitivity which respectively peaks at R (red), G (green) and B (blue).

4. The apparatus of claim 1, wherein the threshold of each of the plurality of pieces of layered image data is changeable.

5. The apparatus of claim 1, further comprising:  
a platen on which the document is placed;  
a platen cover openably mounted on the platen; and  
a platen cover open detection section for detecting an opened state of the platen cover,

wherein operation of detecting the document is performed on the basis of a signal output from the platen cover open detection section.

6. The apparatus of claim 5, further comprising an automatic threshold setting section for setting the threshold of each of the plurality of pieces of layered image data on the basis of a signal output from the plurality of image sensors in a state that the platen cover open detection

section detects the opened state of the platen cover and the document is not placed on the platen.

7. The apparatus of claim 1, wherein the estimated document area determination section determines an effective image area of each scan line on the basis of information regarding an area where not less than predetermined number of pixels which are judged as the pixel on which the document image exists by the comparison section are continuously lined up in each scan line, and determines a smallest rectangular area that includes all the effective image area of each scan line as the estimated document area.

8. The apparatus of claim 1, wherein the estimated document area determination section determines an effective image area of each scan line on the basis of information regarding an area where not less than predetermined number of pixels which are judged as the pixel on which the document image exists by the comparison section are continuously lined up in each scan line, and determines an area included in both an effective area in a previous line and an effective area in a current line as the estimated document area of the current line.

9. An image formation apparatus comprising:  
a plurality of image sensors having different spectral

characteristics from one another;

a layered image generation section for generating a plurality of pieces of layered image data on the basis of an output from the plurality of image sensors;

a comparison section for comparing a threshold of each of the plurality of pieces of layered image data against a pixel value of each of the plurality of pieces of layered image data, the threshold being predetermined corresponding to each of the plurality of pieces of layered image data, and for judging existence of a document image on each pixel;

an estimated document area determination section for determining an estimated document area of each of the plurality of pieces of layered image data on the basis of a result of judging the existence by the comparison section;

a document area detection section for detecting a document area on the basis of the estimated document area of each of the plurality of pieces of layered image data;

a document reading section for reading a document on the basis of the document area detected by the document area detection section; and

an image formation section for forming an image on the basis of image data of the document read by the document reading section.

10. A method for detecting a document area comprising:

generating a plurality of pieces of layered image data on the basis of an output from a plurality of image sensors having different spectral characteristics from one another;

comparing a threshold of each of the plurality of pieces of layered image data against a pixel value of each of the pieces of layered image data, the threshold being predetermined corresponding to each of the plurality of pieces of layered image data, for judging existence of a document image on each pixel;

determining an estimated document area of each of the plurality of pieces of layered image data on the basis of a result of judging the existence of the document image; and

detecting a document area on the basis of the estimated document area of each of the plurality of pieces of layered image data.

11. The method of claim 10, wherein the plurality of image sensors include a color image sensor comprising three sensors having spectral sensitivity which respectively peaks at R (red), G (green) and B (blue).

12. The method of claim 10, wherein the threshold of each of the plurality of pieces of layered image data is changeable.